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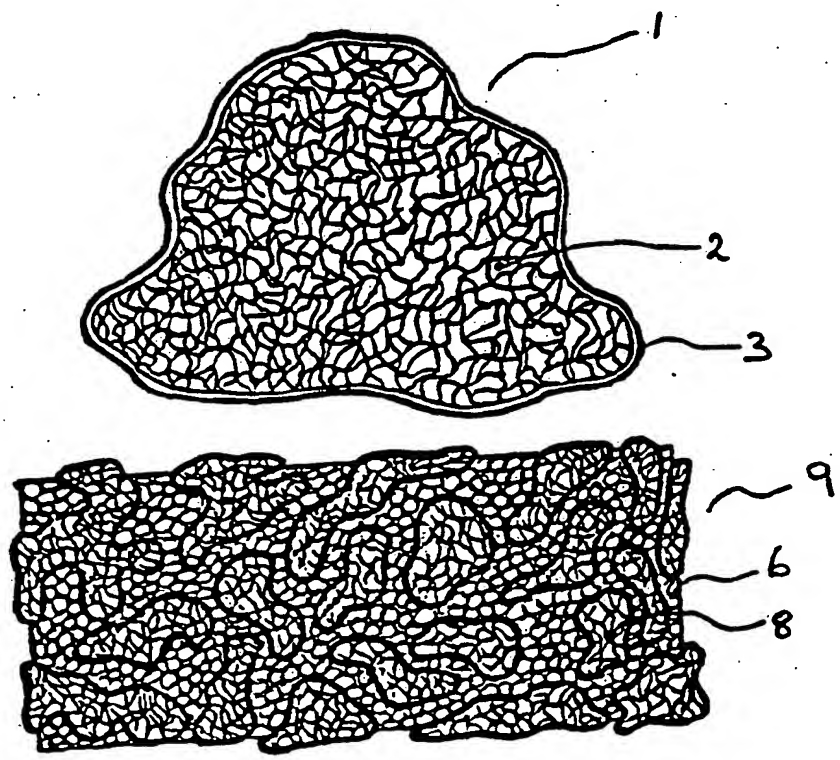
(57) Abstract

An aerate/honeycombed soap product that is self-skinning and of a density less than that of water, is formed from the application of microwaves to a soap piece produced by a conventional soap-making process. The resultant product has increased in size by a factor of about 7, therefore making it a manageable size for both washing hand/face and body, yet dissolving into a high quality lathering froth after one use. The size can be further increased by the application of water spray and subsequent application of a further burst of microwaves. The manufacturing process can also be applied to soap pieces impregnated into a man-made sponge, with the result that the soap pieces increase in size and fill the porosity of the sponge, rendering it a semi-rigid bar. The process can be employed to form both moulded and free form tablets.



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SOAP PRODUCT

This invention relates to the implementation of an expansion, or aeration, process in the manufacture of both body and detergent soap.

Conventional modern soap tablets are generally made by firstly manufacturing a soap base which is dried to the required moisture level, and then mixing with pieces of the soap base the desired additives and triglycerides according to the properties of the product to be made, i.e. perfumes, colorants, moisturisers, super-fatting agents, preservatives, oils, germicides and detergents, tallow etc. After the mixing operation in which the additives are coarsely distributed over the pieces of soap base, the mixture of the soap base and the additives is rendered homogenous. Finally the homogeneous soap is either moulded or extruded to form a bar which is cut into billets from which soap tablets of the desired shape are stamped.

The soap base used may be made by any conventional soap-making process, for example by saponification of fats or by direct neutralisation of fatty acids by sodium or potassium hydroxides. Usually the soap base is a sodium or potassium soap, or a mixture thereof, but if desired other alkali metal, alkaline earth metal, ammonium or amine soaps may be used as well as soap of the triglyceride family. Normally the soap base comprises an amount of water that, after drying, will not generally exceed 20% by weight. Usually the soap base contains no additives but, if desired, additives necessary for the production of soap pieces, for example, preservatives, may be incorporated into the soap base before its formation into bars.

Soap tablets may be opaque, translucent or transparent, depending upon their method of manufacture. A transparent soap may be made, for example, by cooling a suitable soap base solution, such as a fatty acid/alkali soap base dissolved in alcohol or a fatty acid/alkali reactant mixture to which has been added alcohol, sugar solution and glycerol. Translucent soaps may be made, for example, by mechanically working a soap base at controlled temperatures.

Soap tablets may also be made using alternative surfactants, such as synthetic detergents (so-called "soapless soaps"), such alternative surfactants being used in addition to or in replacement of a conventional fatty acid/alkali soap base.

Soap tablets may be formulated for personal washing or alternatively for other cleaning or detergent purposes.

Aerated or floating soaps are described in, for example, UK 539718, US 2048286 and UK 2118058A where air is introduced during vigorous mechanical working of a soap product which is subsequently shaped.

According to the present invention there is provided a process for expanding soap pieces comprising applying microwaves thereto.

According to the present invention a soap piece may be made generally as described above. The soap may thus comprise a soap base in the form of any suitable surfactant or combination of surfactants including conventional fatty acid/alkali soap bases obtainable by the saponification of fats or by neutralisation of fatty acids and synthetic detergent soap bases. The soap base may be combined with desired

additives according to the intended use to form a homogenous soap, which may be optionally shaped by, for example, extrusion, moulding or stamping.

The process of this invention is then applied to permit the manufacture of expanded or aerated soap. In particular aerated soap tablets may be produced where each tablet lasts one wash.

The invention will be more clearly understood from the following description by way of example only with reference to the accompanying diagrammatic drawings in which:

Figure 1 shows a cross-sectional view through a soap piece after a small burst of microwaves have been applied.

Figure 2 shows in perspective a piece of soap having the cross-sectional shape shown in Figure 1.

Figure 3a shows a soap piece prior to application of the method of the invention.

Figure 3b shows the same soap as in Figure 3a, after an application of microwaves.

Figure 4a shows a cross-sectional view of a sponge implanted with soap pieces.

Figure 4b shows the same cross-sectional view of a sponge as Figure 4a after an application of microwaves.

Figure 5a shows a cross-sectional view of a two-part soap mould containing a soap piece.

Figure 5b shows the same cross-sectional view of a mould as Figure 5a after an application of microwaves.

In Figure 1, the cross-sectional shape of an aerated honeycombed soap 1, shows an expanded, aerated, honeycombed internal structure 2 made up of flakes of soap chained

together. The soap's internal structure 2 is surrounded by a skin 3 of the same substance and of a varying thickness for example between 0.5mm to 0.005mm. This expanded, aerated or honeycombed soap may be arranged to allow each tablet to serve one hand/face wash or one body wash in which case the dosage is dependent upon the size of the soap tablet.

The manufacture of such a soap relies upon a further step added to the known soap-making processes. This step involves applying microwaves, preferably by way of small but frequent bursts of microwaves, to soap pieces. Figure 3a shows a soap piece 4. Figure 3b shows the same piece after applying microwaves. The result is a soap tablet 1 that has increased in size by a ratio of 1:7 and has a cross section as illustrated in Figure 1. For a single hand or body wash expanded soap piece as illustrated in Figure 3b with a minimum dimension of 4 mm and a maximum dimension of 150 mm the starting soap piece of Figure 3a may have a minimum dimension of 2.5 mm and a maximum dimension of 50 mm, to which microwaves may be applied for a period of 20-40 seconds (2450 MHz, intermittently applied) at a power of 500W.

It is believed that, since the soap tablet, before treatment of microwaves, may have between 5-20% water content or higher, heat is produced by normal microwave action on the moisture within the soap when microwaves penetrate it. The power or frequency of microwaves applied can be increased e.g. by increasing the intensity or burst frequency, allowing the exposure time to be decreased and vice versa. As a result, the soap is caused to inflate and with this, form a honeycomb/aerate structure.

The size expansion ratio can be further increased if desired, by the application of water (in the form of a fine spray) which rests on the surface of the expanded soap tablet. When the wetted expanded soap tablet is exposed to a further burst of microwaves, the surrounding soap skin repeats the affects explained earlier.

Soft soap bases, show good expansion according to this invention. Such a soap base may have the composition - aside from any non-soap particulate, lying within the ranges:

total fatty matter	70-80% by weight
accompanying cations	6-9% by weight
electrolyte	0.1-1.0% by weight

It is preferred that the soap base has a yield stress at 40 degrees centigrade of at least $1.8 \times 10^{5} Nm^{-2}$.

The final soap tablet with its resultant honeycombed state dissolves in contact with water (at a faster rate than conventional soap, since much of the water from its original state has now evaporated) into a uniform froth with excellent lathering qualities as the chains of soap flakes start to break up. The common occurrence of cracked soap where undue cracking and deterioration of soap bars during handling is caused by age and temperature variation within a domestic situation can now be avoided. A single use size expanded tablet presents major hygiene benefits, since the soap tablet is never shared, with possible cross-infection avoided. Therefore the expanded soap presents itself as a new way of washing with significant improvements for the environment when adopted in areas such as hotel/guest soap, where only what is needed is used - rather

than what is not used being disposed of.

In Figure 4a, the cross-sectional shape of a sponge product 5 shows sponge 6, which may be a man-made sponge, impregnated with soap pieces 7. Figure 4b shows the same cross-sectional shaped sponge 6 impregnated with soap pieces after the application of microwaves for a period of 20 - 40 seconds at a power of 500W (2450 MHz, intermittently applied). As can be seen, the now aerated soap tablets 8 have increased in size by a ratio of roughly 1:7 and have therefore spread across the sponge area to form a semi-rigid sponge block 9. The block 9 is then cooled with the assistance of cold air.

The final sponge block 9 with its resultant honeycombed soap tablets starts to dissolve in contact with water to form a uniform lathering froth as the chains of soap flakes gradually start to break down. What is left after all of the soap has dissolved is only the sponge 6. This enables washing of the body with only one piece of equipment, i.e. the soap sponge 9. This has advantages in situations of small living space or where hygiene is of paramount importance.

In Figure 5a a cross-section of a two-part mould 10,11 is shown. Inside is placed a soap piece 12 of, for example, 10-20% of the size of the mould. Figure 5b shows the same mould as illustrated in Figure 5a, but after the application of microwaves for a period of 20-40 seconds at a power of 500W (2450 MHz, intermittently applied). As shown, the now aerated soap piece 13 has increased in size by aeration to fill the mould. A cooling step then follows after which the soap tablet is released. This moulding process has advantages where exact dosage of soap are required i.e. for personal and medical care,

and other household or industrial cleaning purposes, allowing a measured dose to be repeated precisely.

CLAIMS

1. A process for expanding soap pieces comprising applying microwaves thereto.

2. A process according to claim 1 further comprising:-

applying water in the form of a fine spray to the expanded soap;

further expanding the soap by a further application of microwaves.

3. A process according to claim 1 or claim 2 wherein said soap is expanded to a volume at least 7 times that of the starting material.

4. A process according to any one of claims 1 to 3 wherein said expanded soap has a density less than that of water.

5. A process according to any one of claims 1 to 4, wherein a soap tablet is located in a mould cavity, said soap tablet being expanded by said application of microwaves.

6. A process according to any one of claims 1 to 4, wherein soap tablets of varying or uniform size, are impregnated into a sponge before the application of microwaves.

7. A process of expanding a predetermined amount of soap according to any one of claims 1 to 5.

8. An expanded honeycombed soap product produced by a process according to any preceding claim.

9. A product according to claim 8 comprising sufficient material for a single wash.

10. A product according to claim 8 or claim 9, having a cross-sectional dimension from 4mm to 150mm.

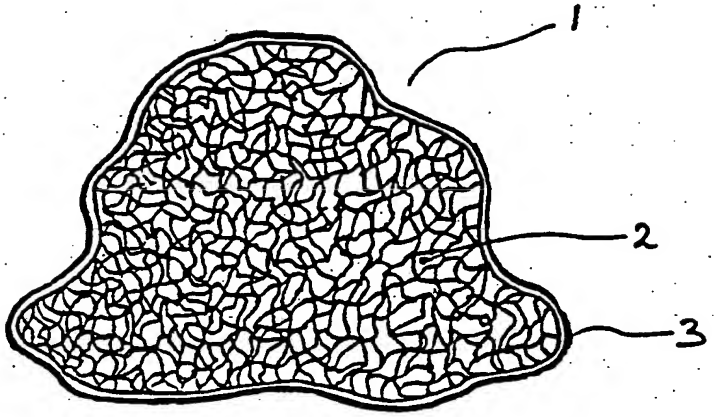

fig. 1

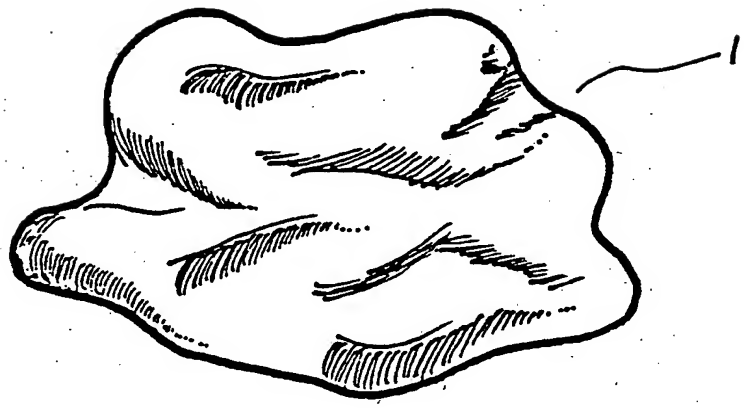

fig. 2

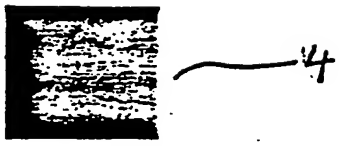

fig. 3a

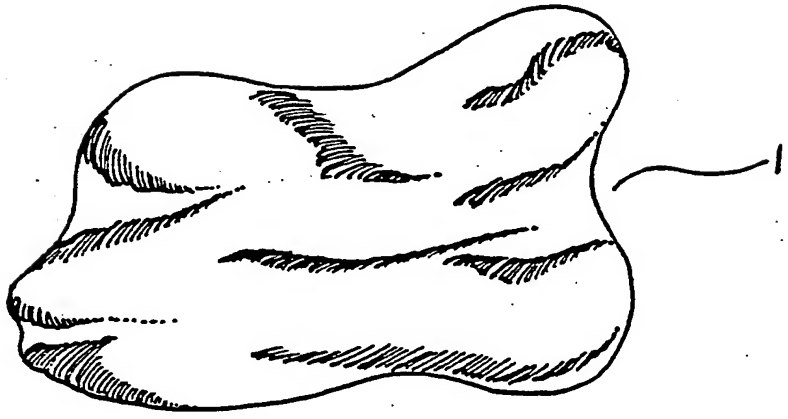

fig. 3b

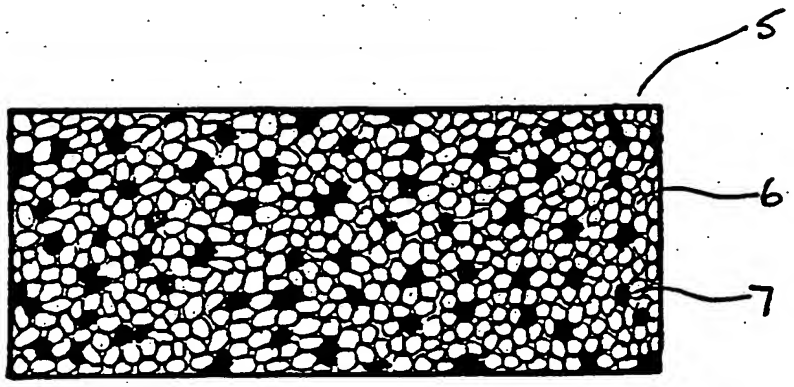

fig. 4a

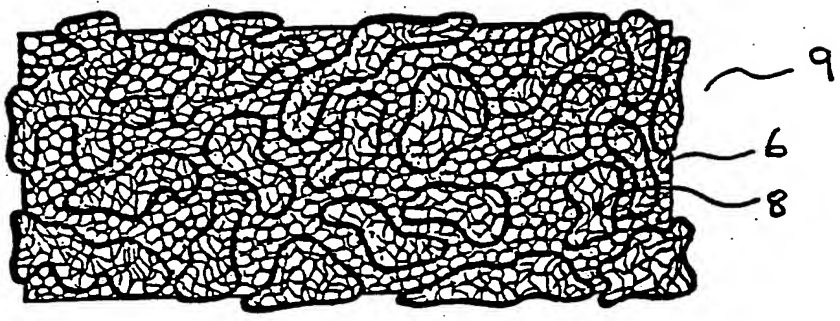

fig. 4b

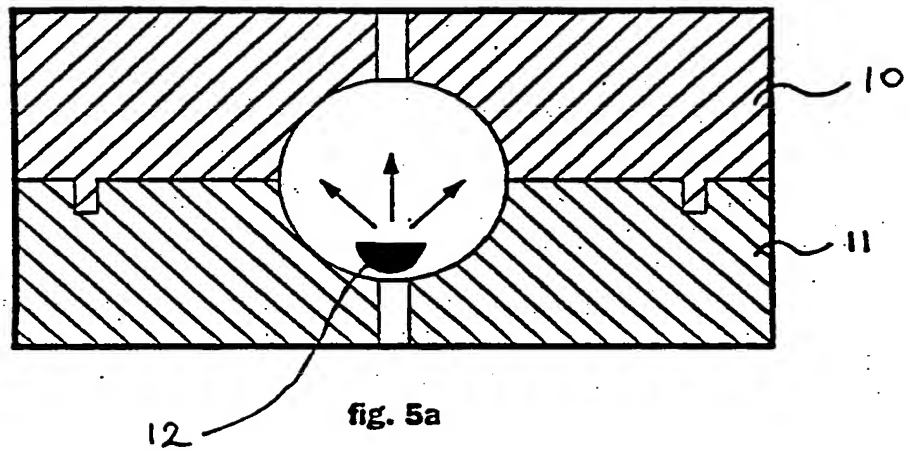

fig. 5a

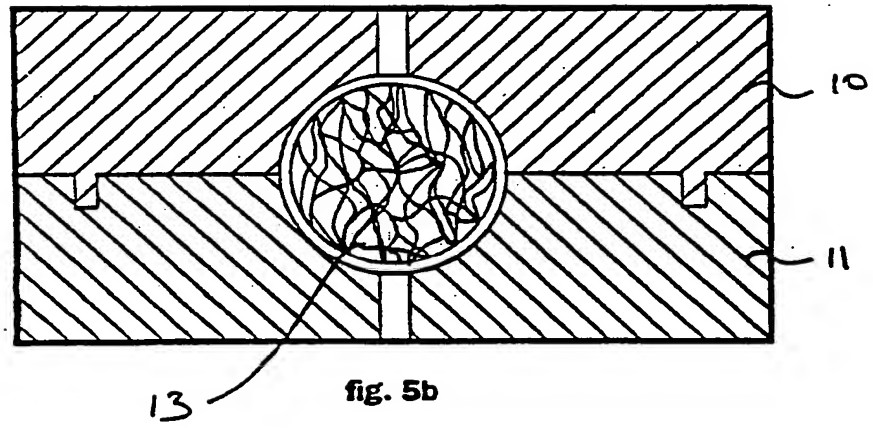

fig. 5b

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 94/01745

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C11D13/14 C11D13/16 C11D17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	GB,A,2 203 752 (FOX S.) 26 October 1988 see the whole document	1,2,4,8
A	US,A,4 885 108 (RICHTER S. P.) 5 December 1989 see the whole document	1
A	BE,A,1 004 876 (T' SERSTEVENS A.) 16 February 1993 see the whole document	1-3
A	US,A,4 118 333 (B.B. DUGAN ET AL.) 3 October 1978 see column 2, line 6 - line 56; claims	1

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1

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GB-A-2203752	26-10-88	NONE		
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